CLAIMS

What is claimed is:

1. A semiconductor package, comprising:

a die;

a die pad having first and second surfaces, the die being mounted on the die pad first surface;

a plurality of leads, each lead having first and second surfaces;

a conductive strap disposed between the die and the first surfaces of the leads to electrically couple the die and the leads;

an encapsulant material encapsulating the die, at least a portion of the die pad, at least a portion of the conductive strap, and at least a portion of the lead first surfaces, the second surfaces of the leads being exposed in a plane of a horizontal exterior surface of the encapsulant material.

2. The semiconductor package of claim 1, wherein a portion of the conductive strap is exposed through the encapsulant material.

3. The semiconductor package of claim 1, wherein at least a portion of the die pad second surface is exposed through the encapsulant material.

4. The semiconductor package of claim 1, wherein the strap further comprises a through hole extending through the strap, the encapsulant material filling the through hole.

5. The semiconductor package of claim 1, wherein the strap further comprises a first end portion coupled to the die, a second end portion coupled to the leads, and a central portion disposed between the first and second end portions, the strap central portion having an aperture formed therein, wherein the encapsulant material fills the aperture.

6. The semiconductor package of claim 1, wherein each lead has a recessed portion adjacent to the exposed second surface, wherein the encapsulant material fills the recessed portion.

7. The semiconductor package of claim 1, wherein the die pad has a recessed portion adjacent to the die pad second surface, the recessed portion extending about the entire periphery of the die pad second surface, wherein the encapsulant material fills the recessed portion.

8. The semiconductor package of claim 1, wherein the strap further comprises a first end portion and lip extending from the first end portion of the strap, and further comprising a conductive layer disposed between the first end portion of the strap and a first surface of the die and between the lip and the first surface of the die, the conductive layer having a greater thickness adjacent the lip than the thickness adjacent the first end portion of the strap.

9. The semiconductor package of claim 1, wherein a portion of a first surface of the strap is exposed through and flush with a first surface of the encapsulant material.

10. The semiconductor package of claim 1, wherein each of the leads has a recessed portion formed in the lead first surface, a foot portion of the conductive strap being disposed in each recessed portion.

11. The semiconductor package of claim 1, wherein one end of the conductive strap is secured to the first surface of each lead by a conductive layer.

12. A semiconductor package, comprising:

a die;

a die pad having first and second surfaces, the die being mounted on the die pad first surface;

a plurality of leads, each lead having first and second surfaces;

a conductive strap disposed between the die and the first surfaces of the leads to electrically couple the die and the leads;

an encapsulant material encapsulating the die, at least a portion of the die pad, at least a portion of the strap, and at least a portion of the lead first surfaces, at least a portion of the strap is exposed through the encapsulant material, and at least a portion of the die pad and the second surface of the leads are exposed in a plane of a horizontal exterior surface of the encapsulant material.

13. The semiconductor package of claim 12, wherein the strap further comprises a planar portion, at least a part of the planar portion being exposed through the encapsulant material.

14. The semiconductor package of claim 12, wherein the strap further comprises a first end portion coupled to the die, a second end portion coupled to the leads, and a central portion disposed between the first and second end portions, the strap central

portion having an aperture formed therein, wherein the encapsulant material fills the aperture.

15. The semiconductor package of claim 12, wherein each lead has a recessed portion adjacent to the second surface of the lead.

16. The semiconductor package of claim 12, wherein the die pad has a recessed portion adjacent to the die pad second surface, the recessed portion extending about the entire periphery of the die pad second surface.

17. The semiconductor package of claim 12, wherein the strap further comprises a first end portion and lip extending from the first end portion of the strap, further comprising a conductive layer disposed between the first end portion of the strap and a first surface of the die and between the lip and the first surface of the die, the conductive layer having a greater thickness adjacent the lip than the thickness adjacent the first end portion of the strap.

18. The semiconductor package of claim 12, wherein the strap further comprises a through hole extending through the strap, the encapsulant material filling the through hole.

19. The semiconductor package of claim 12, wherein each of the leads has a recessed portion formed in the lead first surface, a foot portion of the conductive strap being disposed in each recessed portion.

20. The semiconductor package of claim 12, wherein one end of the conductive strap is secured to the first surface of each lead by a conductive layer.

21. A semiconductor package, comprising:

a die;

a die pad having first and second surfaces, the die being mounted on the die pad first surface;

a plurality of leads, each lead having first and second surfaces;

a conductive strap disposed between the die and the first surfaces of the leads to electrically couple the die and the leads;

an encapsulant material encapsulating the die, at least a portion of the die pad, at least a portion of the conductive strap, and at least a portion of the lead first surfaces, the second surfaces of the leads being exposed in a plane of a horizontal exterior surface of the encapsulant material;

each lead having a recessed portion adjacent to the exposed second surface, wherein the encapsulant material fills the recessed portion;

the die pad having a recessed portion adjacent to the die pad second surface, the recessed portion extending about the entire periphery of the die pad second surface, wherein the encapsulant material fills the recessed portion.

22. The semiconductor package of claim 21, wherein the strap further comprises a through hole extending through the strap, the encapsulant material filling the through hole.

23. A semiconductor package, comprising:

a die;

a die pad having first and second surfaces, the die being mounted on the die pad first surface;

a plurality of leads, each lead having first and second surfaces;

a conductive strap disposed between the die and the first surfaces of the leads to electrically couple the die and the leads;

an encapsulant material encapsulating the die, at least a portion of the die pad, at least a portion of the conductive strap, and at least a portion of the lead first surfaces, the second surfaces of the leads being exposed in a plane of a horizontal exterior surface of the encapsulant material;

a through hole formed in the exposed portion of the conductive strap, the encapsulant material filling the through hole.

24. A semiconductor package, comprising:

a PMOSFET die;

a die pad having first and second surfaces, the PMOSFET die being mounted on and electrically coupled to the die pad first surface, wherein at least one source lead is integrally formed with the die pad;

a plurality of drain leads, each drain lead having first and second surfaces;

a conductive strap disposed between the PMOSFET die and the first surfaces of the drain leads to electrically couple the PMOSFET die and the drain leads;

a gate lead electrically coupled to the PMOSFET die;

an encapsulant material encapsulating the PMOSFET die, at least a portion of the die pad, at least a portion of the conductive strap, and at least a portion of the drain lead

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first surfaces, the second surfaces of the drain leads being exposed in a plane of a horizontal exterior surface of the encapsulant material.

25. The semiconductor package of claim 24, wherein a portion of the conductive strap is exposed through the encapsulant material.

26. The semiconductor package of claim 24, wherein the strap further comprises a through hole extending through the strap, the encapsulant material filling the through hole.

27. The semiconductor package of claim 24, wherein the die pad has a recessed portion adjacent to the die pad second surface, the recessed portion extending about the entire periphery of the die pad second surface, wherein the encapsulant material fills the recessed portion.

28. The semiconductor package of claim 24, wherein the strap further comprises a first end portion and lip extending from the first end portion of the strap, and further comprising a conductive layer disposed between the first end portion of the strap and a first surface of the die and between the lip and the first surface of the die, the conductive layer having a greater thickness adjacent the lip than the thickness adjacent the first end portion of the strap.

29. The semiconductor package of claim 24, wherein each of the leads has a recessed portion formed in the lead first surface, a foot portion of the conductive strap being disposed in each recessed portion.